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Vol. 26 — No. 5

CONTENTS

ORIGINAL PAPERS

The Pupillary Near Reflex. Elwin Marg and Meredith W. Morgan, Jr. ... 183

A Case Study of the Changes of Refraction Accompanying the Changes of the Concentration of Sugar in the Blood. C. W. Weekes and George A. Parkins ... 199

Form and Thickness Considerations of Ophthalmic Lenses for Various Near Points. Frederick W. Sinn ... 202

Subnormal Vision Due to Vitreous Hemorrhage—A Case Report. E. O. Roland ... 209

Subnormal Vision Device Augmenting Palliative Treatment of Hypertension—A Case Report. Harold L. Friedenberg ... 212

EDITORIALS

A.O.A. Policy Needed on Ewing Compulsory Health Proposals. Carel C. Koch ... 215

SPECIAL REPORTS

Professional Fees and Basic Charges for Materials. James O. Baxter, Jr. ... 218

A Plea for a Program of Prepaid Health Care. Ernest A. Hutchinson ... 222

BOOK NOTICES AND REVIEWS ... 225

CURRENT COMMENTS ... 227-230

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THE PUPILLARY NEAR REFLEX*

THE RELATION OF PUPILLARY DIAMETER TO ACCOMMODATION AND THE VARIOUS COMPONENTS OF CONVERGENCE

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INTRODUCTION

Although the pupillary near reflex was first discovered by Scheiner,[1] it was more than two hundred years before the first attempt was made to find its physiologic basis in accommodation and/or convergence. Weber[2, 3] using convex and concave lenses to vary accommodation with total convergence fixed, found no change of pupillary size.

De Ruiter,[4] differing with his predecessor, did get pupillary changes under the same circumstances. A change of convergence by prisms also gave changes of pupillary size, so he concluded that either accommodation or convergence affects the pupil independently of each other. De Ruiter critized Cramer's repetition of Weber's work, although the results agree with his own, on the ground that the distance between the lenses was not taken into account and therefore convergence was not constant as assumed. Donders[5] working with de Ruiter also recognized that both functions affect the pupil.

A professor in the University of California during the last century, Le Conte,[6] was able to change his convergence relative to his accommodation by cross fixating checkerboard patterns in rugs and wallpaper. In this way he found " . . . the contraction of the pupil is most intimately associated with the focal adjustment" and that there was some constriction with extreme convergence.

*This investigation was made possible by a grant-in-aid from the American Academy of Optometry. Submitted on March 3, 1949 for publication in the May, 1949, issue of the AMERICAN JOURNAL OF OPTOMETRY AND ARCHIVES OF AMERICAN ACADEMY OF OPTOMETRY.
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Borthen[7] could find no pupillary effect by using lenses to change accommodation or prisms to change convergence, but he did find a convergence effect when he used +10.00 diopter lenses to inhibit accommodation and changed convergence by varying the fixation point beyond the primary focal distance of the lenses.

Using convex lenses, as did Borthen, to exclude accommodation, Guillery[8] also found a convergence effect and claimed that while he could find no accommodative effect in his presbyopic patient, the pathological evidence of others made it certain that there is an accommodative effect. This raises the question of the value of pathological evidence, much of which is summarized by Duke-Elder[15] with the conclusion that either convergence or accommodation is able to cause independently the pupillary near reflex. There are two strong objections to this type of evidence which should be sufficient to make the results highly suspect, and therefore, subject to rejection when there are, as in this case, direct physiologic methods of attack. First, neither the location nor the extent of the lesion is certain. Secondly, while one function may be paralyzed, innervation, particularly in recent cases, may continue; thus, if the ciliary muscle is paralyzed locally, accommodative innervation from an attempt to accommodate (along with convergence) may cause miosis, although no actual accommodation is taking place.

Seggel[9] disagreed with Borthen, saying that he could regularly elicit an accommodative constriction whereas a convergence constriction by use of prisms was not always obtainable.

In a most precise series of experiments, Vervoort[10] found in 36 subjects no pupillary near reflex with accommodation alone but always when both accommodation and convergence were acting together. He used strong fixed convergence (about 20°) by crossed stereoscopy and stimulated a change of 3.3 diopters of accommodation by moving the targets along the visual lines.

Modifying Vervoort's method so that he claimed convergence fixed at 51° and the change of accommodative stimulus to be 11.9 diopters, Wlotzka[11] found no pupillary near reflex with accommodation. He then used a method of his own with about one degree of uncrossed convergence and stimulated a change of over 10 diopters of accommodation, observing the corneal images of 20 wax candles with a telescope as a pupillometer. His conclusion was that there is no pupillary near reflex with accommodation.

Vervoort and Wlotzka strongly influenced Moderow,[12] who in his very thorough review of the literature up to 1905 was led to believe that convergence always affects the pupil but accommodation never.

In his book on the iris, Magitot[13] in a subchapter on the relationship avoids the question of the basis of the pupillary near reflex, undoubtedly because of the conflicting evidence.

Behr[14] in his book on pupillary movement claims that either accommodation or convergence can cause miosis. For this reason he preferred, instead of the then current term "convergence reflex," *Naheinstellungreaktion* which Duke-Elder[15] has rendered into the "*near reflex.*"*

Duke-Elder concludes from his survey of the literature ". . . that pupillary reaction can occur when either accommodation or convergence is excluded, but that of the two it is more nearly associated with convergence." Newer work since these summaries has indicated that the pupillary near reflex is connected absolutely with convergence but not with accommodation.[16]

Now there are many reasons for all this conflicting evidence. One was the common lack of accurate and quantitative pupillometry. Another was the lack of control of illumination which may have masked a near reflex with a light reflex. Most important of all was the belief that convergence is a simple, single function. Maddox[17] believed that convergence is divided into four components:

1. Tonic convergence.
2. Accommodative convergence.
3. Psychic proximal convergence.
4. Fusion convergence.

Fry[18, 19] and Morgan [21] have confirmed this classification and have shown that accommodative convergence, along with the parallel limits of fusional convergence, is a straight line function. Fry,[20] Hofstetter[22] and Morgan[21] have demonstrated and measured the psychic proximal factor in convergence. Tonic convergence is, of course, presumed constant.

Armed with these new concepts, Fry[23] analyzed the basis of the pupillary near reflex on the logical division of a choice between fusional convergence on one hand, and the combination of accommodation and accommodative convergence on the other. The effect of the psychic proximal factor was not investigated. Of his five subjects, one showed a change of pupillary size with fusional convergence, the others indicated a change with accommodation and accommodative convergence. However, Fry criticized his lack of infra-red photographic pupillometry which necessitated a difficult subjective setting on the part of the sub-

*We have added the qualifying adjective *pupillary* (near reflex) to distinguish it sharply from the reflex of accommodation and convergence when stimulated by a near object.

ject and which did not allow the pupillary size and accommodation to be measured concurrently.

The writers' purpose is to continue and enlarge upon the investigation of Fry.

EQUIPMENT

Basically, the instrument consisted of a haploscope which has been well and often described in the literature[24, 18, 19] with several modifications as sketched in Figure 1. The usual optometer consisted of a

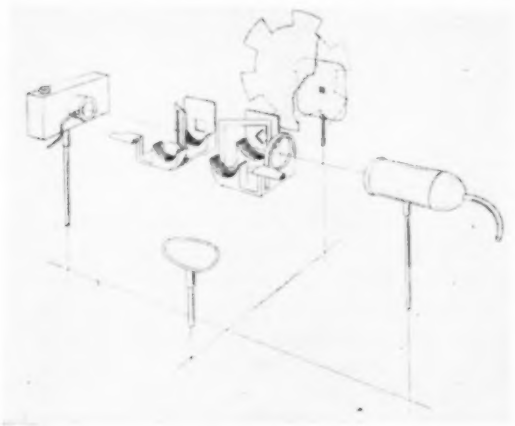

Fig. 1

movable red point source of light and a +8.20 diopter lens. On the left arm was mounted a 35 mm. camera with an extension tube for the ostensibly f 2.8 lens so adjusted that the photographs of the left pupil through the half-reflecting mirror were actual size. The winding and shutter release of the camera were remotely controlled from the right side and slightly to the front of the subject where the operator was obscured from view by black drapes and equipment supports.

The infra-red light source* (not illustrated) which was placed by the left arm, directed a slightly out of focus image of the lamp filament by way of a plane mirror to the left eye. A 30 volt, 30 ampere projection bulb was run at 700 watts to obtain a rich source of infra-red radiation without overheating the Wratten No. 87 gelatin filter. In addition to the large converging lenses, a 1.9 cm. thick water cell was

*The authors wish to express their gratitude to J. E. Gullberg, Associate Professor of Metrology in the Department of Zoology at this University for the loan of most of the components of this infra-red source.

mounted before the filter to absorb the short infra-red rays so that no heat from this source was felt by the subject. Although there was a slight red glow visible, it was a constant and a peripheral one.

The three lens cells before the half-reflecting mirrors, Figure 1, are the proximal lens cells and the three behind, the distal. On the far ends of the distal cells are fixed field stops, a diamond shape on the right and a square on the left to discourage peripheral fusion.

Fixation targets were placed at 6, 1, 1/2, 1/3, 1/4 and 1/5 meters. All were photographic reproductions of black König type bars reduced so that each had a subtense of one minute of arc for the space between them, at the eye. Each target was illuminated from above at a roughly 45 degree angle and each light was controlled by a selector switch and a rheostat. Batteries were used to obtain 120 volts direct current, thus preventing variation in illumination because of unstable line voltage.

Just beyond the right field stop was a black episcotister with six equal sectors. The same source of constant direct current was fed to the motor whose speed was controlled by rheostats. For a flicker speed standard we used a stroboscopic disk on the back surface of the episcotister facing a small argon lamp which of course follows its 60 cycle A. C. line source. In this way the flicker was known to be constant at 40.02 flickers per second.

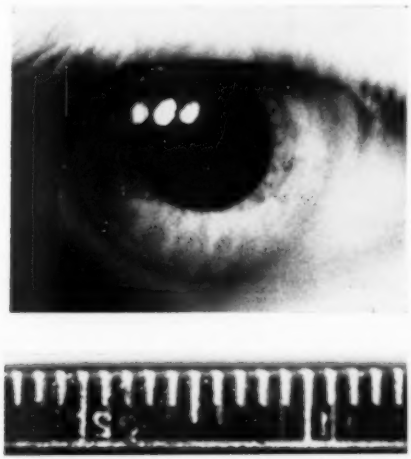

Fig. 2

A small source of light and lens could be plugged in the left field stop to provide a spot of light which could be aligned with the opto-

meter spot to measure accommodative convergence while not interfering with the pupillometry.

The subject had at his right hand a telegraph key by which he could signal the experimenter with a small, dim, shielded lamp.

A millimeter rule was clipped on the front of the left proximal lens cells so that it lay on the apparent plane of the subject's pupil. Photographing this before aligning the subject in the apparatus gave a precise scale on each film. When the film was later projected to a size of 10 diameters, the pupillary diameter was read directly with a millimeter rule, the divisions of which represented 1/10 of a millimeter on the pupil. Figure 2 is an example of a pupillometric photograph.

PROCEDURES

Ametropic subjects had their corrections placed in the proximal lens cells which corresponded to the usual spectacle plane. The subjects were all seniors in the School of Optometry of the University of California and were most cooperative and acute observers. They were given much practice for weeks before the actual experimental runs were begun. In this way pupillary changes due to unavoidable noise such as the clicking and rewinding of the camera and due to the excitement of the experiment were minimized.

Illumination was determined by means of a standard flicker rate for all distances; the experimenter slowly reduced the illumination until the subject first saw fusion of the flicker about the fixation target. Then the observer signalled the operator who recorded the rheostat setting and repeated the procedure at least seven times or until a crude mode was evident in the distribution. The rheostat was set for each distance before any data was taken. In this manner the retinal illumination was constant for all six fixation distances although the luminance of the targets varied.

After the illumination was set, the operator moved the optometer spot which indicated that he was ready for the subject to set it. Then in quick succession the optometer was set, the camera shutter released, the optometer setting recorded, the camera rewound and the cycle was repeated for a total of five readings and exposures. Later these were respectively translated into the actual accommodation at the primary principal plane of the eye and the apparent pupillary diameter maintained for the conditions of the experiment. Two minutes adaptation time were allowed for the first distance in each experimental run but was not found necessary for successive stimulus distances.

In determining accommodative convergence, the small bulb and lens combination was plugged into the left field stop. It gave a spot

of very dim light which was projected several meters away. Since the absolute degree of convergence was not required, one could without calibration take the relative amount of convergence directly from the algebraic sum of the scales of the arms of the haploscope when the spots from each side were in vertical alignment.

When accommodation was changed by means of lenses with the fixation distance confined to 1/3 meter, the lenses were inserted in the distal cells (beyond the half-reflecting mirror) and their effective values calculated for the primary principal planes of the eyes.

Prisms were used to change fusional convergence; on the left side in the distal cells to prevent interference with the pupillometry, and on the right side in the proximal cells so that it would affect the optometer spot along with the field stop. All prisms were calculated for effectivity at the center of rotation of the eye. Using these prisms, experimental runs were made for fixation distances of 5, 1, 1/3, and 1/5 meters.

RESULTS

FIRST EXPERIMENT. *Pupillary diameter as a function of accommodation (and any possible psychic proximal effect) by changes in stimulus distance.* In each of the four subjects this function may be considered

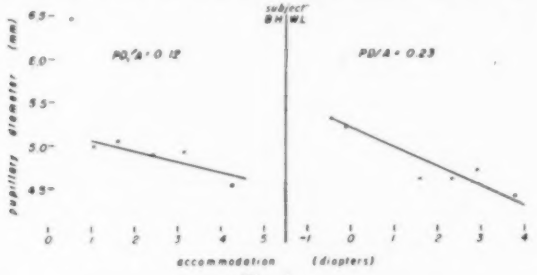

Fig. 3

a straight line with the qualification that in two of them the function is linear only after the first diopter of accommodation (Figure 3).

To describe conveniently the slope of these straight lines, we shall use the expression, "Ratio of pupillary diameter to accommodation," abbreviated *PD/A*, where *PD* is expressed in millimeters and *A* in diopters. These values varied from 0.12 to 0.53 millimeters per diopter of accommodation.

Curves of accommodation as a function of stimulus distance are, incidently, found to be normal.

SECOND EXPERIMENT. *Same as first experiment except for the inclusion of accommodative convergence.* In addition to finding the *PD/A*,

which again is a straight line for all five of the subjects with the same qualification as mentioned before (Figure 4), we now have the "Ratio

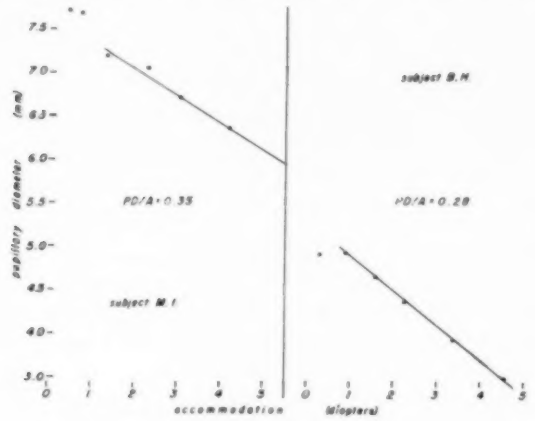

Fig. 4

of accommodative convergence to accommodation" which may be abridged to *AC/A*. That this relationship is a straight line after the first diopter is well documented.[18, 19, 21]

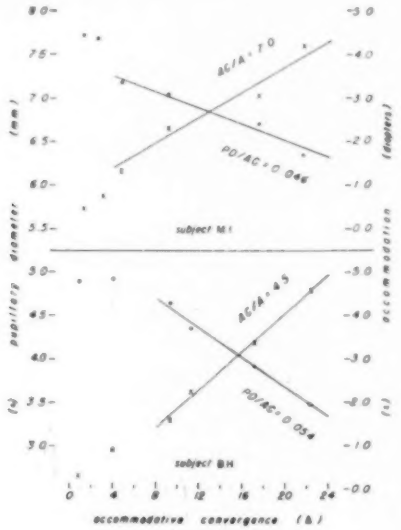

Fig. 5

Also we have what we may call the "Pupillary diameter to accommodative convergence ratio" or *PD/AC* which is linear as would be expected since both the numerator and denominator are, as we have seen, directly proportional to accommodation. All convergence is expressed in prism diopters. Values of *PD/A* ranged from 0.20 to 0.35 millimeters per diopter, of *AC/A* 3.2 to 7.0 prism diopters per diopter and of *PD/AC* 0.027 to 0.081 millimeters per prism diopter. Figure 5 shows typical results and all ratios are given in columns 2, 6 and 7 of Table I.

THIRD EXPERIMENT. *Pupillary diameter as a function of binocular stimulus distance.* This is a complex but normal situation in which all components of convergence are acting normally. Because these linear curves are indistinguishable from the *PD/A's* already found and since accommodation (with accommodative convergence) is the main dependent variable, we may call these functions also *PD/A*, always keeping in mind that they *may* not be purely so. Values varied from 0.18 to 0.48 millimeters per diopter.

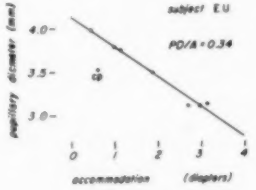

Fig. 6

FOURTH EXPERIMENT. *Pupillary diameter as a function of accommodation varied by lenses; binocular fixation distance at 1/3 meter.* In four of the five subjects the *PD/A* is linear as Figure 6 exemplifies.

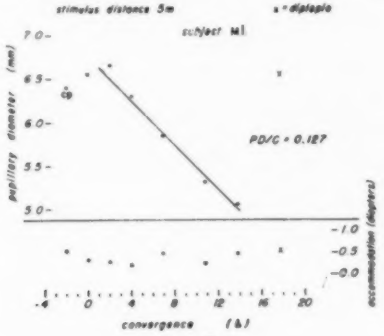

Fig. 7

Values ran from 0.15 to 0.34 (Table I, column 4). Check points ("cp" in Figure 6) taken after the regular series of points was finished show a smaller diameter of the pupil.

The fifth subject gives a large scatter from which no plausible curve can be drawn. This instance may be due in part to the irregular order in which the points were taken.

FIFTH EXPERIMENT. *Pupillary diameter as a function of fusional convergence at stimulus distances of 5, 1, 1/3, and 1/5 meters.* In those

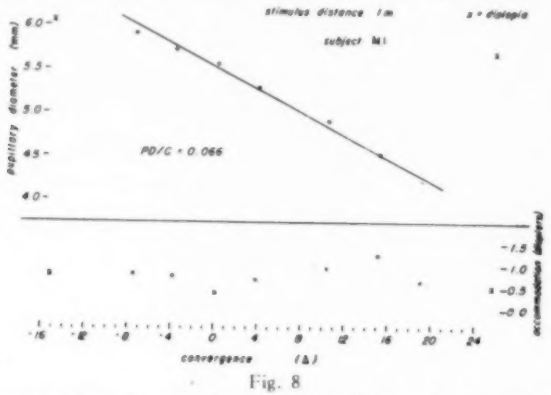

Fig. 8

cases where the functions at first were nonlinear, single retakes showed them to be straight lines. Graphs of subject M. I. are given in Figures 7 through 10. In the 1/3 and 1/5 meter distance graphs (Figures 9 and 10) accommodation is not constant enough to be able to consider that this change of accommodation does not affect the resultant points.

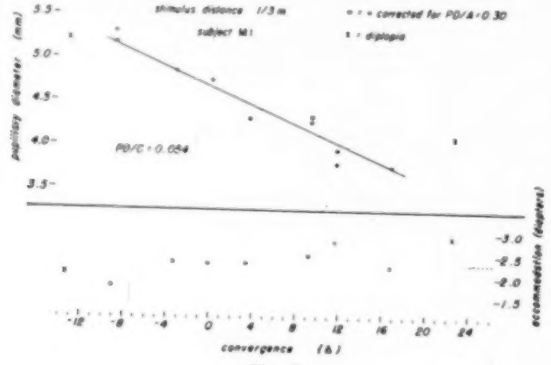

Fig. 9

TABLE I RESULTS

function	*PD/A*					*AC/A*	*PD/AC*	*PD/C*				
experiment	1	2	3	4	mean	2	2	5	5	5	5	mean
column	1	2	3	4	5	6	7	8	9	10	11	12
B.H.	0.12	0.28	†	*	0.20	4.5	0.054	0.045	0.022	0.029	0.077	0.043
M.I.	0.53	0.35	0.18	0.15	0.30	7.0	0.046	0.127	0.066	0.054	0.017	0.066
W.L.	0.23	0.35	0.38	0.27	0.38	3.2	0.081	0.000	—.021	0.006	0.003	—.003
R.R.	0.33	0.33	0.48	0.23	0.34	5.3	0.066	0.000	0.000	0.009	0.017	0.007
E.U.	†	0.20	0.24	0.34	0.26	5.5	0.027	0.000	0.000	0.016	0.016	0.008
(Subjects)					mean							
					mean							
					0.30							

*not linear
†not available

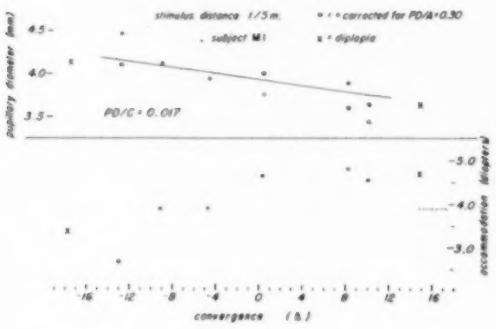

Fig. 10

Therefore a correction was made for the change of pupillary diameter due to this change of accommodation from any arbitrary level of accommodation (interrupted lines on graphs) based on the arithmetic mean *PD/A* for the subject concerned. In most cases where this correction was necessary it improved the linearity of the points.

The "Ratio of pupillary diameter to fusional convergence" may, in keeping with our previous designations, be shortened to *PD/C*. The values range from 0.000 to 0.127 millimeters per prism diopter (Table I, column 8 through 12).

Although three of the subjects had little or no ametropic correction in the horizontal meridian, two of them (W. L. and E. U.) had two diopters there which changes the effectivity of the prisms used in this experiment. Correction for this error in these two subjects in the most extreme instances comes to less than two prism diopters and can therefore be ignored.

DISCUSSION OF RESULTS

PD/A VALUES. *In every subject, accommodation (and accommodative convergence) plays a strong part in causing a pupillary constriction.* As can be seen in columns 1 to 5 of the table these ratios are not very constant either in any one individual or among individuals. In the third experiment the values (column 3) show no trend from those of other experiments where convergence was not allowed to act normally. This indicates that these values depend on accommodation and not fusional convergence, that is, that they are truly *PD/A* values. However the amount of fusional convergence normally demanded is not great relative to the fusional reserve (or duction), so a small amount of

fusional convergence sharing in the elicitation of the pupillary near reflex is still conceivable.

Proximal factors of psychic origin in accommodation and convergence are fully discussed in the literature[20, 21, 22] but not so their effect on pupillary size. There are three modes by which psychic proximal factors may have such an effect:

1. Through proximal accommodation (which probably does not occur[21, 22]).
2. Through proximal convergence (which does occur).
3. By direct effect of the cerebral cortex on the pupillometer center.

Even in the unlikely occurrence of proximal accommodation, it is included in the actual accommodation as found by the optometer and is not distinguished from a nonproximal component. Proximal convergence increases as the stimulus is brought nearer as would a direct proximal effect if it occurs at all. In experiment four the stimulus distance was kept constant so if there is a proximal convergence or direct pupillary effect the *PD/A* values should be less than those found in the other experiments. In general, such a proximal effect is indicated, but not only would more trials and subjects be necessary to determine it significantly, but also a slight change in the procedure since in experiment four—unlike in the first three experiments—there was no correction for decreased retinal illumination caused by the constricting pupil.

It is conceivable that a major source of error may be due to emotional factors affecting the pupillary size. At times, an experimental run took as long as 30 minutes; the monotonous procedure encouraged the attention of the subject to wander and perhaps allowed the induction of emotional thoughts. That this potential source of error was under fairly good control, probably because of the caliber of the observers, is demonstrated by the fine linearity of the great majority of the graphs, for otherwise large random departures from a straight line would be expected. Those graphs which are nonlinear are considered to have an emotional component error because a rerun usually turns out to be linear.

Another potential major source of error may be faulty decisions of the point of critical fusion of flicker. But again the linearity of the results shows that control of illumination was sufficiently precise.

There are two possible and compatible explanations for the smaller pupils at the check points ("cp" in Figures 6 and 7): first, after-discharge, since the pupil had previously been constricted, and second, the adaptation by the pupil to the previously reduced retinal illumination, also due to the miosis, tends to cause greater constriction when the

pupil is allowed to return to its former mydriatic state. As stated above, only in the first three experiments where the illumination was set for each stimulus distance by the flicker yardstick is there no error for the effect of the pupil on retinal illumination.

PD/C VALUES. The subjects may be divided into two groups, those with a mean PD/C of zero (<0.01) and those with a definite value (>0.04).

As seen in column 12 of Table I, three of the five subjects have zero for the mean *PD/C* which, of course, means that *for them fusional convergence does not have a role in the elicitation of the pupillary near reflex*. This applies to all stimulus distances from 5 to 1/5 meter.

Two of the five subjects have a definite *PD/C* value and therefore, contrary to the others, *their fusional convergence does play a part in evoking the pupillary near reflex*. There seems to be no correlation with stimulus distance. Although accommodation is not the only factor causing a miosis in these subjects, it is the major one as may be seen from a simple example. We may assume that a person fixating fine print at 40 cm. is using 2.50 D. of accommodation and 15Δ total convergence. The latter can be divided into 10Δ of accommodative and proximal convergence and 5Δ of fusional convergence. The accommodation (2.50 D.) times the mean *PD/A* (0.30) gives the share of miosis due to accommodation (0.7 mm.). Fusional convergence (5Δ) times the *PD/C* (0.05) yields the constriction attributable to fusional convergence (0.3 mm.). Thus *in those cases where fusional convergence does participate in the pupillary near reflex, it plays a minor role relative to accommodation under the normal conditions assumed*. When the *AC/A* is small, fusional convergence (and proximal convergence) must be greater so that it would be possible theoretically for fusional convergence to surpass accommodation in the activation of the pupillary near reflex. However this would be unlikely since the *AC/A* would have to be less than one prism diopter per diopter of accommodation.

THE FUSION REFLEX OF THE PUPIL. Tests involving fusional convergence as a dependent variable were usually carried out until fusion was disrupted, both for positive fusional convergence (adduction) and negative fusional convergence (abduction), and the size of the pupil recorded. This has been investigated by Schubert and Burian[25] who called the dilatation of the pupil with the disruption of fusion and the constriction with regained fusion the *fusion reflex (Fusionreaktion)*. In many cases we found that the fusion reflex consisted of the pupil tending to return to the size it had before prisms were introduced. It is therefore possible that the pupillary fusion reflex may be a mani-

festation of the pupillary near reflex. There were, however, many variations which are undoubtedly accountable to the lack of control of retinal illumination when the eyes were in their diplopic positions. Work on the pupillary fusion reflex needs to be done with careful control of accommodation and convergence to see if it is actually a separate and distinct function.

SUMMARY

For the conditions of the experiment the following results are found:

1. Pupillary diameter as a function of accommodation is linear although in some cases only after about the first diopter.
2. Pupillary diameter as a function of accommodative convergence is linear.
3. Pupillary diameter in those instances where it is a function of fusional convergence is linear.
4. These linear functions may be abbreviated as is the ratio of accommodative convergence to accommodation, *AC/A*. Thus

Ratio	Abbreviation	Mean Value	Units
Pupillary Diameter/Accommodation	PD/A	0.30	mm./D.
Pupillary Diameter/Accommodative Convergence	PD/AC	0.055	mm./Δ
Pupillary Diameter/Fusional Convergence	PD/C	0.052 or zero	mm./Δ

5. A psychic proximal factor in the pupillary near reflex, direct and/or with proximal convergence, is indicated.
6. Under normal conditions *the pupillary near reflex is essentially elicited by accommodation.* In two of the five subjects, fusional convergence plays a minor rôle, about one-third of the total effect; but in the other three subjects fusional convergence has no pupillary effect, accommodation alone giving constriction of the pupil.
7. It is proposed that the pupillary fusion reflex of Schubert and Burian may be simply a manifestation of the pupillary near reflex.

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A CASE STUDY OF THE CHANGES OF REFRACTION ACCOMPANYING THE CHANGES OF THE CONCENTRATION OF SUGAR IN THE BLOOD*

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Mrs. J. L. H., age 42, was first seen on December 24, 1940. Her chief complaints were difficulty in seeing at distance and near. Her history disclosed she had a hysterectomy in 1932, after which she enjoyed good health except for occasional gall bladder attacks. On this visit she accepted: O. U. +0.50 D. sph. ⊂ +0.50 D. cyl. axis 90. Add. +1.50 D. sph. The early presbyopia, in all probability, resulted from the hysterectomy. The media were clear and there was no retinal degeneration.

This correction was satisfactory until September, 1946, when she complained of difficulty in seeing at distance and near. The correction found at that time was: O. U. +1.25 D. sph. ⊂ +0.50 D. cyl. axis 90. Add. +2.00 D. sph. All media were clear. Her blood pressure was 120 systolic and 70 diastolic. There was no retinal degeneration.

This correction gave satisfactory results until the Spring of 1948, when she began to experience difficulty in seeing at distance. She reported for an examination May 31, complaining of considerable nervousness, difficulty in seeing at a distance, as well as loss of strength. Her refraction at this time showed she had 20/40 vision in the right eye and 20/60 vision in the left eye with the correction given in 1946. A new refraction enabled her to have 20/20 vision in each eye with: O. U. +0.50 D. cyl. axis 90. The media were clear and fundus normal.

In view of the raise in blood pressure, the rapid fatigue and extreme nervousness, she was referred for a general physical examination. The authors found the basal metabolism normal, the blood count normal and normal heart. The urine was highly acid and carried some sugar. She carried 253 mgms. of sugar per 100 cc. of blood. (A blood sugar of 80 to 120 is considered normal.) Diet and insulin were prescribed.

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On June 9, ten days later, her blood sugar was 120. She accepted a correction of: O. U. +1.50 D. sph. ⌒ +0.50 D. cyl. axis 90, which gave her 20/20 vision. It will be noted that there was a change of +1.50 D. in the refraction in the ten days. The media were still clear: the blood pressure was 118 systolic and 75 diastolic. While Mrs. H. was a very cooperative patient, considerable difficulty was experienced in arriving at a suitable dosage of insulin, as well as getting her to stay on the right diet to keep the blood sugar normal.

She again reported on August 3, at which time her blood sugar was 400. Her distance correction was: O. U. +0.50 D. cyl. axis 90, the same as found on May 31.

On September 13, her blood sugar was down to 204. Her correction was O. U. +1.00 D. sph. ⌒ +0.50 D. cyl. axis 90, which gave 20/20 vision. It will be noted this is +1.00 D. more than she accepted August 3.

On October 12, her blood sugar was 186. The correction for best vision was: O. U. +1.25 D. sph. ⌒ +0.50 D. cyl. axis 90 or +0.25 D. more than was shown a month previously when the blood was 204. On October 19, the blood sugar was 110. The correction for best vision was:

O. D. +1.50 D. sph. ⌒ +0.50 D. cyl. axis 90.

O. S. +1.75 D. sph. ⌒ +0.50 D. cyl. axis 90.

Or +0.25 D. more for the right eye and +0.50 D. more for the left eye than she accepted the week before when her blood sugar was 186. The retina was still healthy and all media clear.

On November 9, the blood sugar was 110. The correction accepted was the same as on October 19.

On November 30, the blood sugar was 86. The correction was still the same as found on October 19.

On December 14, the blood sugar[1] was 110 with no change in the correction.

Reviewing this case, we see there is +1.50 D. difference in the right eye and +1.75 D. difference in the left eye accompanying the changes in blood sugar: Mrs. H. being less hyperopic when the blood sugar was high than when it was normal. The greatest change occurred between a blood sugar of 120 and 250 mgms. per 100 cc. of blood: there being

[1]A blood sugar test is taken at least 12 hours after the patient has had any food. For this reason the patient is usually required to come to the laboratory in the morning without his breakfast. All of the tests mentioned in the above were taken in this manner, presumably showing the low point of blood sugar during the day. After eating, blood immediately absorbs sugar from the food and the readings are higher according to the sugar content of the food taken.

no further reduction of the hyperopia when the blood sugar rose to 400.

Throughout this study the corneal curves have remained the same; the retina has presented a healthy picture; and the media have remained clear, so we must conclude that the changes of refraction were due to changes of the index of refraction of the cornea, the aqueous, the lens or the vitreous. It is to be hoped that Mrs. H. is successful with her diet and insulin dosage as to prevent further disturbances.

We often see in the literature mention of pathological changes in the media and in the retina as a result of diabetes. We have noticed changes of refraction in diabetes on several different cases but did not have the opportunity to make as careful a study as we have in this particular case.

With this case study as a foundation, it would seem that the thought of diabetes should be entertained when we encounter a fairly rapid change in refraction.

Of the recent papers mentioning changes due to diabetes, there is one by Mote[2] which merits comment. He cites a case who presumably became more hyperopic as the blood sugar rose. However, his patient did not exhibit symptoms suggesting the need of a general physical on her first visit. The fact that she did show a blood sugar of 250 on her 1940 visit is not conclusive proof she was not carrying as high or higher blood sugar on her 1938 visit.

[2]Mote, Herbert G. A Change in Static Refraction as the Blood Sugar Varies—A Case Report. Am. J. Optom. & Arch. Am. Acad. Optom. 25.11.522-524. 1948.

ABSTRACTS

THE COURSE OF FOVEAL LIGHT ADAPTATION MEASURED BY THE THRESHOLD INTENSITY INCREMENT. H. DeH. Baker. (Department of Psychology, Columbia University.) Journal of the Optical Society of America. 39.2.172-179. 1949.

Previous experiments in "light adaptation," the change in sensitivity of an initially dark-adapted eye as the eye is exposed to light, have indicated initial high sensitivity decreasing progressively as illumination is prolonged. The author, defining sensitivity as the reciprocal of the barely perceptible intensity increment, finds that sensitivity is low immediately after the onset of the adapting light, and that it increases to a maximum in about three minutes, subsequently falling to a final, intermediate level.

An ingenious apparatus was used, enabling the presentation of brief flashes of intensity increments superimposed on bright backgrounds of known intensity. Since earlier experimenters used different definitions of sensitivity and different types of apparatus, their results are not comparable.

The author also considers his experimental data in relation to neural processes in vision and chemical theories of photo-reception. He concludes that the fact that sensitivity reaches an early maximum does not jibe with simple theories of the visual cycle. Future correlation awaits determination of the mechanism and photochemical constants of the visual cycle.

BERNARD ROSETT

FORM AND THICKNESS CONSIDERATIONS OF OPHTHALMIC LENSES FOR VARIOUS NEAR POINTS*

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The dioptric power of an ophthalmic lens is usually accepted as equal to its vertex dioptric power (D_v). The vertex dioptric power of a lens is the reciprocal of the back focal length of the lens in meters. This back focal length (f_b) is the distance from the back or ocular surface of the lens to its secondary principal focus.

All ophthalmic lenses of the same vertex dioptric power are usually considered interchangeable, except for considerations of image size, even though they may have many different forms and thickness. Clinically, the dioptric power of a lens is considered equal to its vertex dioptric power, regardless of its form or thickness. It is the purpose of this paper to discuss the limitations of this assumption in dealing with lenses of appreciable thickness.

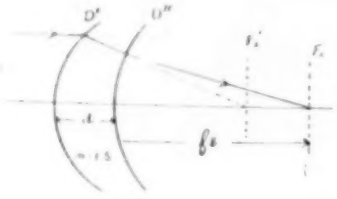

FIG. 1

$$D_v = D' + D'' + (D')^2 \frac{d}{n} + \ldots$$

The dioptric power D of a thin lens is equal to the algebraic sum of the dioptric power D′ and D″ of the two surfaces of the lens. Thus,

$$D = D' + D''$$

The vertex dioptric power D_v of a thick lens is expressed by the following:

$$D_v = D' + D'' + [(D')^2 \, d/n] + \text{''''''}$$

Here, D′ and D″ represent the dioptric powers of the front and back surfaces of the lens respectively and d/n represents the reduced thickness

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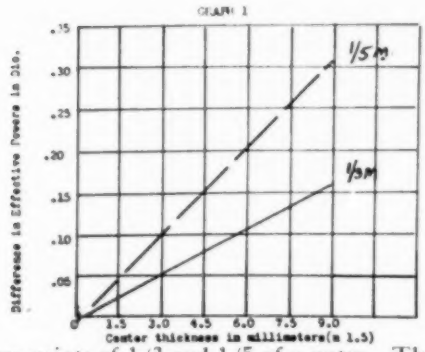
†Optometrist. Fellow, American Academy of Optometry. Member of faculty.

of the lens. Although, this expression contains a number of terms, each succeeding term beyond the second is smaller than the preceding one. For the purposes of this paper, it is not necessary to carry calculations of the vertex dioptric power beyond the third term as the errors thus introduced are too small for clinical consideration. For example, the error in the computation of a lens having surfaces of plus 14 and minus 6 diopters respectively, a thickness of 7.5 mm., and a refractive index of 1.5 will be of the order of 6/100 of a diopter.

The vertex dioptric power of a thick lens differs from the dioptric power of a thin lens, for all practical purposes, by the value of the third term in the above expression. Also, a thick lens and a thin lens of the same vertex dioptric power will show different effective powers for the same near points. In order to cause thick lenses of different forms and thicknesses to have the same effective powers for the same near points, it would be necessary to have their principal planes coincident. This is not practical for refractive purposes, since it would then be impossible to have the back surfaces coincident.

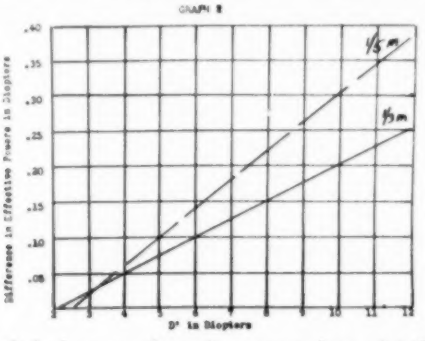
In the third term, $[(D')^2\ d/n]$, of the equation given above, D' is the dioptric power of the front surface of the lens for a distant object. However, if the value of D' for a near point is considered, then D' becomes approximately equal to the dioptric power of the front surface minus the dioptric equivalent of the near point. This relationship provides a ready method for approximating the variation in the effective power of a thick lens for different near points. For example, a near point of 1/3 of a meter makes the third term become equal to $[(D'-3)^2\ d/n]$, while a near point of 1/5 of a meter brings the third term to the value of $[(D'-5)^2\ d/n]$. On this basis, the variations in effective power of a thick lens for different conditions of use may be assumed to be equal to the differences between the value of this third term when computed for a distant object and the values of the same term when computed for a number of different near points. These differences reduce to the value of $[(6D'-9)\ d/n]$ for a near point of 1/3 of a meter and to the value of $[(10D'-25)\ d/n]$ for a near point of 1/5 of a meter. It can be seen from these expressions that the variation in the effective power of a thick lens for different near points is a function of the dioptric power of the front surface (D') and the reduced thickness (d/n) of the lens. The vertex dioptric power enters into consideration in this discussion because it establishes the minimum limit for the center thickness of a plus lens of any given diameter.

Graph 1 shows the calculated variation in the effective powers of thick lenses constant in form but varying in thickness from 1.5 mm.



to 9 mm. for near points of 1/3 and 1/5 of a meter. The front surfaces of the lenses are assumed to have a power of plus 6 diopters for all thicknesses.

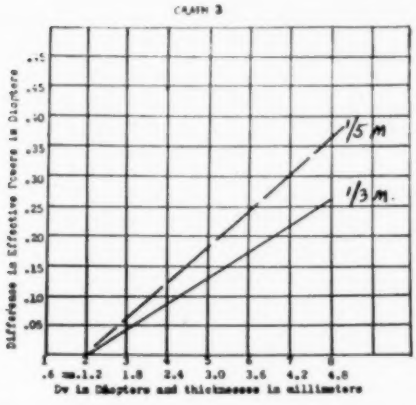
Graph 2 shows the variation in the effective powers of thick lenses constant in thickness but varying in form from plus 2 diopters to plus



12 diopters for their front surfaces for near points of 1/3 and 1/5 of a meter. The center thickness of all lenses is assumed to be 6 mm.

Graph 3 shows the differences between the effective powers of thin lenses and the effective powers of thick lenses of the same vertex dioptric powers for near points of 1/3 and 1/5 of a meter. The vertex dioptric powers of these lenses vary from plus 1 to plus 8 diopters. Each thick lens considered is assumed to possess the minimum center thickness possible for a 50 mm. diameter lens of the required vertex dioptric power.

Graph 4 shows the differences between the effective powers of thin lenses and the effective powers of thick lenses of the same vertex dioptric powers for near points of 1/3 and 1/5 of a meter when the thick lens



has a center thickness of 3 mm. more than the minimum center thickness possible for a 50 mm. diameter lens of the required vertex dioptric power. The vertex dioptric powers of these lenses vary from plus 1 to plus 8 diopters. These conditions are similar to those commonly met with in safety lenses.

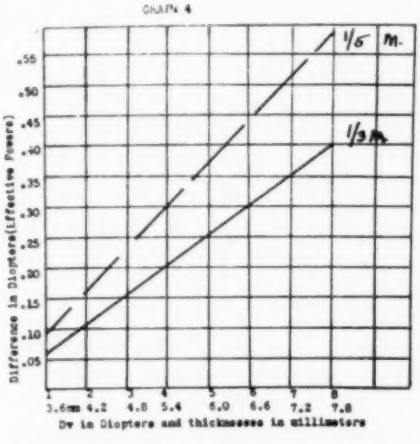


Table 1 furnishes the calculated values for the effective powers of several series of single vision lenses for near points of 1/3 and 1/5 of a meter, in which all lenses of the same series have the same vertex dioptric power but differ individually from each other in both form and thickness. Here the center thickness of each lens is listed in column d, the

TABLE 1

Vertex Power	*d*	D′	D″	1/3 M.	1/5 M.
+4.00	0	+10.00	— 6.00	+4.00	+4.00
+4.00	3 mm.	+ 9.80	— 6.00	+3.90	+3.85
+4.00	5.4 "	+ 9.65	— 6.00	+3.81	+3.73
+4.00	5.4 "	+ 6.80	— 3.00	+3.85	+3.81
+4.00	5.4 "	+ 3.94	0.00	+3.94	+3.94
—4.00	0.00 "	+ 6.00	—10.00	—4.00	—4.00
—4.00	1.00 "	+ 6.00	—10.03	—4.02	—4.03
—4.00	3.0 "	+ 6.00	—10.07	—4.05	—4.07
—4.00	3.0 "	+ 3.00	— 7.02	—4.02	—4.01
—4.00	3.0 "	0.00	— 4.00	—4.00	—4.00
+5.00	0.0 "	+11.00	— 6.00	+5.00	+5.00
+5.00	4.0 "	+10.68	— 6.00	+4.84	+4.77
+5.00	6.0 "	+10.54	— 6.00	+4.77	+4.66
+5.00	6.0 "	+ 7.75	— 3.00	+4.84	+4.78
+5.00	6.0 "	+ 4.90	0.00	+4.91	+4.90
—5.00	0.0 "	+ 6.00	—11.00	—5.00	—5.00
—5.00	1.0 "	+ 6.00	—11.03	—5.02	—5.03
—5.00	3.0 "	+ 6.00	—11.07	—5.05	—5.07
—5.00	3.0 "	+ 3.00	— 8.02	—5.02	—5.01
—5.00	3.0 "	0.00	— 5.00	—5.00	—5.00
+6.00	0.0 "	+12.00	— 6.00	+6.00	+6.00
+6.00	4.0 "	+11.63	— 6.00	+5.83	+5.75
+6.00	7.0 "	+11.36	— 6.00	+5.68	+5.55
+6.00	7.0 "	+ 8.65	— 3.00	+5.80	+5.71
+6.00	6.8 "	+ 5.83	0.00	+5.87	+5.84
—6.00	0.0 "	+ 6.00	—12.00	—6.00	—6.00
—6.00	1.0 "	+ 6.00	—12.03	—6.02	—6.03
—6.00	3.0 "	+ 6.00	—12.07	—6.05	—6.07
—6.00	3.0 "	+ 3.00	— 9.02	—6.02	—6.01
—6.00	3.0 "	0.00	— 6.00	—6.00	—6.00

INDEX = 1.5 F. W. SINN

dioptric powers of the front and back surfaces of the lenses are listed in columns D′ and D″, respectively, and the effective powers of these lenses for near points of 1/3 and 1/5 of a meter are listed under columns 1/3 M and 1/5 M, respectively.

It should be noted that although the vertex dioptric power has been kept constant for all the different forms and thicknesses of lenses, the effective powers of these different forms are all different in varying amounts for the same near points of 1/3 and 1/5 of a meter. It should be noted further that the difference between the vertex dioptric power and the effective powers for these near points is at its greatest for lens powers above plus 4 diopters in those lens forms having the highest front surface powers and the greatest thicknesses. (Thicknesses of the order listed are found in safety lenses.) At the same time, it should also be observed that the flatter the form of the lens and consequently the lower the dioptric power of the front surface, the smaller

will be the difference between the vertex dioptric power and the effective power for the same center thickness at the near points considered.

TABLE 2

Dist. R in Vertex Power	d	D′	D″	Type of Bifocal	1/3 M.
+6.00	0.0 mm.	+12.00	— 6.00	Either	+9.00
+6.00	3.0 "	+11.72	— 6.00	Back	+8.86
+6.00	4.5 "	+11.63	— 6.00	Front	+9.00
+6.00	7.0 "	+11.36	— 6.00	Front	+9.00
+6.00	7.0 "	+11.36	— 6.00	Back	+8.68
+5.00	0.0 "	+11.00	— 6.00	Either	+8.00
+5.00	4.0 "	+10.68	— 6.00	Front	+8.00
+5.00	4.0 "	+10.68	— 6.00	Back	+7.84
+5.00	6.0 "	+10.54	— 6.00	Front	+8.00
+5.00	6.0 "	+10.54	— 6.00	Back	**+7.77**
—5.00	0.0 "	+ 6.00	—11.00	Either	—2.00
—5.00	3.0 "	+ 6.00	—11.07	Front	—2.00
—5.00	3.0 "	+ 6.00	—11.07	Back	—2.05
		+3.00 ADD			F. W. SINN

Table 2 furnishes the calculated values for the effective powers of several series of bifocal lenses for a near point of 1/3 of a meter, in which all the lenses of the same series have the same vertex dioptric power and the same bifocal addition but differ individually from each other in both form and thickness or in the location of the bifocal segment. In this table, column d contains the center thickness of each lens. Columns D′ and D″ contain the dioptric powers of the front and back surfaces respectively of the major portion of the bifocal lenses. The surface of the lens upon which the bifocal segment is located is stated in the column headed "type of bifocal," and the effective power of the near portion of each bifocal lens at a near point of 1/3 of a meter is listed in column 1/3 M. The bifocal addition for all lenses in Table 2 is plus 3.00 diopters.

The results given in Table 2 show that the effective power of a bifocal lens at near varies with the location of the segment. If the bifocal segment is moved from the front surface to the back surface of a thick lens, of such dimensions as are commonly met with in a safety lens, the change in dioptric power is appreciable. For example, the effective power of a thick bifocal lens of plus 6 vertex dioptric power with a bifocal segment of plus 3 diopters placed on its back surface will differ as much as 0.32 of a diopter from the same lens with the segment on the front surface.

The same type of effectivity calculations as reported above can be

carried out for sphero-cylindrical lenses, but unless the cylindrical powers are greater than 4 diopters, the differences in power will be approximately the same as that for spherical lenses with the values of the cylinders very little affected. The effect of lens thickness upon sphero-cylindrical lenses can be eliminated entirely in thick lenses of high cylinder by placing the cylinder on the back surface of the compound lens.

In conclusion, it must be stated that the effective powers of lenses for near points should be taken into account, when considering lenses whose center thicknesses must of necessity be appreciable. In particular, this will apply to safety lenses in which the minimum thicknesses must be 3 mm. greater than the thicknesses ordinarily encountered for the lens power.

The variation in the effective powers of a given lens for different near points can be reduced to a minimum by the use of thinner lenses or lenses of flatter form.

Two bifocal lenses, one an ordinary spectacle lens and the other a safety lens, both with the same vertex dioptric power and bifocal segments of the same dioptric value placed on their back surfaces, can differ by as much as 1/4 of a diopter or more in effective power. This difference could be of clinical importance to a patient wearing ordinary spectacle lenses interchangeably with safety lenses. It might be difficult to explain this discrepancy without analysis since the two lenses for the same eye would have the same vertex dioptric power. This difference in the effective powers of bifocal lenses of different thicknesses can be reduced materially if the bifocal segments are placed on the anterior surfaces of the lenses.

ABSTRACTS

MAINTAINING VISUAL ACUITY IN THE NAVY. E. A. Betts and V. Dorris. The Optometric Weekly. 39.20.691-692. 1948.

The authors present a report of 16 members of the Navy and Marine Corps who reported for orthoptic training to improve distance visual acuity. This had fallen below normal while the subjects were engaged in college training for commissions. In every case distance visual acuity had been normal when the subject entered the service. The majority of cases had pseudo-myopia in low amounts. Of the 16 cases treated, ten were able to pass subsequent distance visual acuity tests although in most of these the manifest refractive findings showed no change. The orthoptic training was done at the Reading Clinic of the Pennsylvania State College.

C. C. K.

SUBNORMAL VISION DUE TO VITREOUS HEMORRHAGE—A CASE REPORT*

E. O. Roland†
Brevard, North Carolina

Patient, white, male, age 38. First seen, January, 1946.

His complaint was periodic but severe pain in both eyes, worse in O. D. Vision poor in O. D.

History: In the Summer of 1944 a foreign body (piece of steel) was imbedded in O. D. Patient does not remember the part of the eye involved.

The patient had reported for an Army induction physical examination on October 26, 1944. His reported visual acuity: O. D. 20/20; O. S. 20/20; O. U. 20/20.

In November, 1944, five molar teeth were pulled from the right upper jaw. Three days later he became blind in the right eye. Vision has improved from that date to January, 1946, to 20/40 (Snellen).

Fundus: (January, 1946).

O.D.—No evidence of scar or foreign body on cornea. Macular degeneration. Vascular growth from temporal margin of disc curving upward and anterior toward the posterior surface of the lens, bifurcating about three-fourths of the distance, part of the vessels going up and temporal and the rest down. Two small areas of white tissue formation in lower periphery. Also multiple hemorrhages in lower fundus.

O. S.—New vessel formation on temporal edge of disc extending into the vitreous about 2 mm. where they terminate. Patch of healed chorio-retinitis immediately below macula about one disc diameter in area. Two small areas of retinal degeneration upper and lower temporal periphery. Multiple hemorrhages in temporal periphery.

Vision: O. D. 20/40; O. S. 20/20; O. U. 20/20.

Fields: Left constricted more than the right. O. S.—Corresponding blind spot to retinitis. The peripheral degenerations in both eyes do not show up in fields because the fields are constricted inside of these areas. Fields were taken on perimeter with 5 mm. white target.

Refraction: +0.25 D. sph. ⌒ —0.25 D. cyl. axis 90, O. U. No change in acuity.

The patient was referred to the Charlotte Eye, Ear, and Throat

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Hospital and was seen on January 23, 1946. The ophthalmologist's report follows:

"The patient has a formation of new blood vessels in the vitreous in both eyes. The condition has reached considerable growth in the right eye and is already interfering with his vision. The formation of new vessels in the left eye is in the area of the upper and outer boundary of the disc and has so far not interfered with his vision.

"I do not know the cause of this condition. We always suspect lues, but in his case the blood Kline was negative. I had a blood count made and the report was as follows: W. B. C. 6600, N. 65%; L. 29%; L. M. 2%; T. 2%; B. O; E. 2%. This doesn't indicate any systemic infection of any account."

The patient was next seen on January 6, 1947. The entire right fundus hazy, but visible, indicating beginning vitreous hemorrhages. O. S.—String-like vitreous opacities in upper nasal part of vitreous located centrally and running in an anterior-posterior direction. Patient referred to an Asheville ophthalmologist.

The patient was next seen on July 7, 1947. O. D. New chorioretinitis lower temporal area. Vitreous exudate seems to be lessening. O. S. Increase in length of vessels into the vitreous. Multiple hemorrhages present in entire periphery.

On November 28, 1947, patient reports that he had been to the Baptist Hospital at Winston-Salem on November 3.

Fundus: O. D. Complete vitreous hemorrhage. O. S. Fluid vitreous with long patches of muscae volitantes. Entire fundus cloudy but visible.

Patient now referred to ophthalmologist at Wilmer Eye Institute at Johns Hopkins Hospital. Following is their report:

"The patient stated that he had suddenly lost the vision in the right eye two years ago. At that time there was slight redness but no pain. After about six or seven months the vision in the right eye gradually improved but did not return to normal. Since then he has had three or four similar attacks occurring first in one eye and then in the other. The last attack occurred four months ago in the right eye. Recently he has been taking Rutin 20 milligrams t. i. d., calcium tablets and intra-muscular injections. He stated that the loss of vision of three years ago seemed to follow the removal of infected teeth. He had had a small splinter of steel in the cornea of the right eye removed before the onset of the disease. Patient has nine siblings perfectly normal.

"The right eye is completely normal except for a heavy vitreous ray with the slit lamp and a massive vitreous hemorrhage which allowed only a good red reflex with the ophthalmoscope. No fundus details could be made out. Tension is normal. Vision is limited to hand movements.

"In the left eye the anterior segment is perfectly normal. There is a heavy vitreous ray with the slit lamp. The vitreous is fluid and there are heavy vitreous opacities which are especially intense in the entire periphery concentrated on the temporal side. Scattered throughout the entire periphery are large areas of localized hemorrhage and exudates. There are numerous new formed vessels arising from the retinal system. There is no sheathing of the veins. Tension is normal and vision is limited to 20/40.

Manifest refraction:	L. +0.25 D. cyl. axis 180 — 20/40
Retinoscopic:	With 5% Homatropine L. + .75
Static:	With 5% Homatropine L. + .50 20/40

"Fields: R. E.: Poor light projection above, good light projection inferiorly, nasally and temporally.

"L. E: Fields to 1° white are constricted to about 40° everywhere except nasally where it is reduced to 25°. The field to 1° red is constricted above to 10° and temporally to 30°.

"Impression: Extensive vitreous hemorrhage in the right eye, numerous areas of hemorrhage and exudate in the periphery of the left eye. This is undoubtedly Eale's disease. I told the patient that the treatment he had been receiving was the best that could be given. I explained to him that the only way in which we could try to find the cause of the disease would be to admit him to the hospital and study all his bodily functions. He did not wish to make this study at the present time, but stated that if his eyes became worse he would want to return for the study. I told him to continue the treatments he was receiving and to keep in touch with you."

The patient was next seen on May 3, 1948. Fundus: No change. Visual Acuity: O. D. Light projection. O. S. 20/200. Patient referred to a different ophthalmologist than previously reported in Asheville.

The patient was next seen on December 13, 1948. The patient states that he has had two X-ray treatments and reports an improvement in vision. Naked visual acuity at this time: O. D. 5/400: O. S. 20/80.

Fundus: O. D.—Periphery of retina visible. Otherwise no change. O. S.—Extensive vitreous opacities, vitreous still fluid and the areas of fundus that are visible show some slight hemorrhage. Disc and macula areas not visible.

On January 10, 1949, patient reports that there is an improvement in right eye after fourth X-ray treatment. Fundus: O. D.—Occasional glimpse of retinal vessels. Retina hazy. O. S.—No change. Visual acuity: O. D. 20/100 +2. O. S. 20/80 —1.

LAWRENCE BUILDING
BREVARD, NORTH CAROLINA

ABSTRACTS

AN ANALYSIS OF NATIONAL HEALTH SERVICE CASES. H. Freeman. The Optician. (London, England.) CXVII.3023.177-179. 1949.

The author points out that more presbyopic patients are applying for refractive care in England today than was the case in the pre-National Health Service days. This is particularly true in the 55-65 year bracket. He also finds, of those patients now using glasses, that 61 per cent of the present applicants had used their present corrections for three or more years. Included in this group are those patients who have used glasses for years but never had had a refraction. He finds that this group constitute 19.6 per cent of the patients using obsolete corrections. 2 tables.

C. C. K.

SUBNORMAL VISION DEVICE AUGMENTING PALLIATIVE TREATMENT OF HYPERTENSION—A CASE REPORT*

Harold L. Friedenberg†
Richmond, Virginia

Mr. C. W. was first seen on August 15th, 1948. His chief complaint at that time was blurred vision at both distance and near. His old correction was +1.00 D. sphere with a +1.50 D. sphere added for near. Both eyes had the same correction and the patient has been wearing his present glasses since 1941. Visual acuity through the old correction was: O. D. 20/60, O. S. 20/70, O. U. 20/60, J4 at near. Uncorrected visual acuity was O. D. 20/100, O. S. 20/200, O. U. 20/100.

Ophthalmoscopy revealed a typical hypertensive retinopathy in both eyes and an incipient senile cortical cataract in the left. In the right eye a patch of exudate one-half the size of the disc was seen midway between the macula and the disc. A large hemorrhage was located a disc diameter away and superior-nasally to the disc. Many petechiae were seen throughout the periphery of the fundus. There was much narrowing of the blood vessels and some blurring of the disc. The left eye presented the same picture but to a more marked degree. The hemorrhages in this eye were more proximal to the macula and the exudates were more extensive.

The static refraction was:

O. D. +2.00 D. sph. ⊂ +0.50 D. cyl. axis 180
O. S. +2.50 D. sph. ⊂ +0.50 D. cyl. axis 180
Add +2.25 D. sph. O. U. for near.

The maximum acuity obtained with this correction was O. D. 20/30, O. S. 20/50, O. U. 20/30, J3 at near.

Since this correction materially aided the patient, thereby enabling him to continue with his work, it was prescribed. The patient was then apprised of the seriousness of his condition and referred to an internist for treatment. The report of the physician revealed a blood pressure of 230/150 and the diagnosis was primary hypertension with cardiac hypertrophy. The patient was given medication, put on a salt-free diet, and advised to engage in a less strenuous occupation.

On October 28, 1948, the patient was again seen relative to his ocular condition. At this time it was observed ophthalmoscopically

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†Optometrist.

that some of the original hemorrhages present at the previous examination had disappeared, but that other fresh hemorrhages had occurred in different parts of the retina. The macula area of the right eye showed no appreciable change. Refraction at this time disclosed:

O. D. +2.75 D. sph. V. A. 20/25
O. S. +3.00 D. sph. V. A. 20/50
Add +2.25 D. sph. O. U. V. A. J3

The correction was changed accordingly. The patient at this time reported that he had consulted a second physician who told him his blood pressure fluctuated between 230/150 and 190/120. He advised that the patient discontinue his work and spend part of each day in bed.

The patient was next seen on November 30, 1948, at which time he reported that his visual acuity was reduced at both distance and near. The ophthalmoscopic examination presented essentially the same picture as had existed at the previous examination, but revealed further hemorrhages in the macular area of the right eye. The refractive findings were the same as those found on October 28, 1948, but now visual acuity through that correction was reduced to: O. D. 20/40, O. S. 20/60, O. U. 20/60. J6 at near. No prescription could be arrived at by ordinary refractive means which improved the visual acuity.

The patient was asked how he felt physically and stated that he felt worse now than when he was working, although his physician had advised him that his blood pressure was now slightly lower than before. The patient then stated that his inability to read made his hours in bed seem exceptionally long and tiring. He further stated that he disliked listening to the radio, and reading, his only previous diversion since he stopped working, was no longer possible. He reported that he had long periods of melancholia during which he could only think of the dreaded consequences of his condition.

Due to the transient nature of the retinal pathology in which old hemorrhages were becoming absorbed and new ones appearing, it was deemed unwise to refract the patient with permanent telescopic spectacles as the objective. Distance vision was not sufficiently decreased to interfere with the patient's daily routine and the nature of the pathology was such that a spontaneous increase in acuity was not impossible. It was noted, however, that the 1.7 telescopic spectacle improved the distance acuity to O. D. 20/20, O. S. 20/25, O. U. 20/20. The patient was then seated with a trial frame in place and the +2.75 D. sphere distance correction before the right eye and an occluder before the left. The National Electric Company near telescopic lens was then

placed over the distance correction on the right eye and the patient was asked to read the near point card. He read the J3 type with ease and was visibly moved by his ability to read type that small. With the trial frame still in place he was then seated in an ordinary chair and handed a magazine. He was told to read for as long as he desired and was instructed in the necessary side to side head movements which facilitate reading with a telescopic device.

After it was determined that the patient could use the telescopic device with comfort, a +2.75 D. sphere was then put into the right eye wire of a regular metal frame. A Walton occluder was cut to size and inserted in the left eye wire and the telescopic reading accessory was then clipped over the right lens and positioned so that its center was four millimeters below the optical center of the carrier lens. Oversize pads were put on the frame and it was then adjusted to the patient's face. He was again handed a magazine and was able to read with ease. He was instructed to take the spectacles home and use them for reading only and report back in two weeks. He returned again on December 10, 1948, and appeared to be in much better spirits than before. His fundi were checked and no material change noted. He reported that he felt a great deal better since he could read and now had something to occupy his mind. His physician reported that the patient's blood pressure level was unchanged. His physician further reported to the examiner that this or any other means of easing the patient's mental anguish and directing his thinking elsewhere than to himself was beneficial to the patient's general well-being.

The author realizes that a more optically perfect device would have better served the purpose from a standpoint of visual efficiency, but the economic position of the patient, the almost constant changes in the extent of the pathology, and the grave prognosis necessitated the greatest amount of comfort at the least possible expense.

313 NORTH SECOND STREET
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ABSTRACTS

STANDARDIZATION OF LENS SHAPES. G. A. Fry. The Optometric Weekly, 39:49:2337-2339, 1948.

The author suggests limiting the total number of shapes of ophthalmic lenses in the effort to secure a workable system of identification of these shapes and to enable opticians and others who work with this problem to come to some uniform system of shape classification. He reviews the already proposed Spooner system and the Chappell-Sasieni system and suggests certain refinements. 2 illustrations.

C. C. K.

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A. O. A. POLICY NEEDED ON EWING COMPULSORY HEALTH PROPOSALS

After a six-month discussion of the Ewing compulsory health insurance plan it is time we looked at the record to see where the three numerically large health groups stand on this subject.

Medicine and dentistry are reported opposed to the Ewing plan. Optometry, on the other hand, has yet to be heard from officially. The A. O. A. has taken no definable position.

It should be significant to optometrists that the rank and file as well as a great majority of leaders in medicine and dentistry are opposed to the Ewing plan. This indicates that these health workers understand the regimentation and loss of freedom to be experienced by both patient and doctor if this un-American program is adopted.

It must be remembered that the Ewing plan is at the focal point of these objections. Most health workers admit that there is room for improvement in general health planning, particularly as this applies

to certain phases of health care. This fact was stressed by the Academy in its appeal to the A. O. A. of last December. The Academy is on record as opposing only the Ewing plan. It is not opposed to health programs essentially democratic in character and in line with the traditional spirit of American enterprise. This is also true of the position taken by medicine and dentistry.

To keep the record straight, it must be pointed out that the Ewing plan is patterned after the current health insurance program in England. Most of the essential tools of the English plan are to be found in the Ewing recommendations. These same techniques are also found in the older European state health programs.

In these programs, lay persons or professional administrators make rules and rules and more rules from day to day, all of which apply to health care! These rules have the force and effect of law. For instance, in England we now find bureaucrats making time studies of refractions performed by ophthalmologists with the admitted purpose of reducing the State payment to the ophthalmologist. The question of the quality of the work was never raised. The only point at issue is that some governmental department believes that ophthalmologists are overpaid for their refractive services and the new yardstick for payment seems to be "time."

British optometrists, too, are beginning to get their instructions from London. There, committees working under governmental direction are now making plans to reduce fees and limit the total number of refractions which the State will permit any optometrist to make each week. And this is only the beginning.

It is to prevent this type of bureaucratic meddling that this Journal presented its recommendations to place the legislative and administrative machinery for health programs at the State level. Our proposal dealt only with the indigent and the medically indigent, as it was felt that no one else was entitled to consideration.

This proposal aroused some question as to the "rights of millions of people in these United States who are being denied adequate health care." Ewing was quoted by several writers, and Hutchinson* in his "Plea For Prepaid Health Care" also raises this point. This is a question which certainly merits study. If any one is denying certain groups of our citizens health care, certainly something should be done about it. Here we believe the facts speak for themselves. In certain sparsely settled rural areas there is a lack of health care. This has always been

*See page 222.

true and one possible solution would be to station salaried health workers at selected points to overcome this disadvantage. It must be remembered, however, that the persons living in these areas are more or less pioneers who knew of these disadvantages when they located their homes at considerable distances from urban centers. These people lack many of the other essentials of Twentieth Century civilization as we understand them. To furnish them all of the essentials from tax supported sources would produce a burden which would wreck our economy.

The lack of adequate medical care for the Negro and the sharecropper of the South is also a problem. Here we find a truly underprivileged group of fairly large proportion—frequently living in close proximity to adequate health facilities yet unable to enjoy these due to a lack of resources and a failure to understand the value of these services. This is a sectional problem to a great degree and much educational work must be done upon it. Being sectional, however, it should be administered by the states involved with grants-in-aid of federal funds to supplement local support.

Then we have the indigent. That group who due to various circumstances are unable to support themselves. For this group both public and private agencies are already supplying care in various amounts —the urban indigent faring better as a rule than the rural indigent, but both having some health service available in most counties.

The three preceding groups constitute only a small minority, and the proponents of compulsory health insurance include the needs of employed persons of low and moderate income as the bulwark of their demand for health care. Are these persons being denied health care? As a rule not. For all ordinary requirements the world's finest health service is available. These persons of low and moderate income can, if they wish, afford all day-to-day health care. They drive automobiles. They are among the big consumers of liquor and tobacco, both items enjoying a far greater national income than is spent annually for all health care in America. They have the means to purchase this day-to-day health service if they want it badly enough to give up something else to get it. And many, of course, do. However, some of the less provident fail in this regard as they also fail to provide proper clothing, food and shelter. Just where the responsibility rests on others for the acts of the improvident has been an argument for centuries. If the thrifty are to be taxed and taxed to maintain the shiftless on the same standard of living as the thrifty, the incentive for thrift will disappear and tax sources will dry up. The Ewing plan to be sure, would collect

something from the employed improvident to help defray its cost, but the amount collected, even at the full total suggested, would fall short of paying the whole bill and the government would be forced to levy other taxes to make up the deficit.

That health care is not available to all is freely admitted. It is unfortunately denied to some by their own actions and lack of foresight. This can be solved in part by education. The writer's sympathies are strongly for lending a helping hand. Yet the problem is greater than the mere application of federally subsidized drugs, dentures or glasses. It has a fundamental bearing on our economy and on our American way of life which can be forever destroyed by an ill advised or carelessly selected program of public health care.

The A. O. A. will soon meet in Boston. The subject of compulsory health care should be high on its agenda, and the shortcomings of the Ewing proposals should be presented to the delegates along with the arguments of the proponents who seem to favor this major change from our free enterprise system. The A. O. A. will perform a real service to optometry by taking a forthright position on this matter.

CAREL C. KOCH

SPECIAL REPORTS

PROFESSIONAL FEES AND BASIC CHARGES FOR MATERIALS*

James O. Baxter, Jr.†
Beaufort, North Carolina

There has been considerable discussion as to what proportion of the total fee charged a patient should be designated as the professional fee and what part should be earmarked as the charge for materials. Individual practices among ethical practitioners vary somewhat in this regard, some few still charging as little as $3.00 for an "examination" and up to $20.00 or more for "glasses"—materials—while others charge as much as $25.00 or more as a professional fee, adding the net laboratory fee, with odd cents rounded off, for such materials as are prescribed.

Digressing for a moment, it is obvious that this problem of correct and adequate fees would not exist for the optometrist or the

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ophthalmologist if we were in the happy position of the average general practitioner regarding pharmaceuticals, as there is a pharmacist around the corner, so to speak, for every six or eight medical practitioners, so that physicians are spared any explanations as to the cost of drugs and pharmaceuticals. Many refractionists, perhaps a majority of them are, on the contrary, remote from an optical laboratory and are therefore obliged, for practical reasons, to dispense optical materials and do certain limited laboratory work and adjusting themselves. It is with these practitioners and their problems that this paper will deal.

Most readers have probably read the recommendations of the American Optometric Association regarding professional fees, service and material charges. These recommendations have caused considerable favorable comment and some criticism within the profession. Objections seem to center around the net laboratory fee for materials. Regarding this we feel that perhaps the Association's brochure did not make it sufficiently clear that to such a laboratory fee must be added a service charge for fitting and adjusting, which is of particular moment when repairing or replacing frames and lenses. Without such an additional charge, many feel that their incomes would suffer material reduction. The brochure, however, specifically states that no suggestion with such a result in mind is being advanced. The whole plan is to shift emphasis from the cost of materials, as such, to service—specifically to *professional* service. Such a program is essential for optometry. If this, then, is agreed upon, it remains only to work out the major details of the plan. It is felt that no insuperable difficulties should be encountered in this, assuming, of course, that those considering such a modification of professional economy are, in their own hearts, *professional-minded* in contra-distinction to the *mercantile-minded*. For these latter we have no suggestions, unless it be that they drop any pretense of professionalism and conduct themselves as out-and-out merchants, in candidly mercantile surroundings, with all the impedimenta of commercialism. Optometry has no place for them any more than has medicine or dentistry, and it is urgently recommended that such be barred from all organized optometric activity of any sort whatever, national or local.

It has been suggested that the individual optometrists merely restate, to himself as well as to his patient, precisely what is being charged for and exactly how much it costs: what part is professional fee, what part for technical service and what part for necessary materials. As mentioned elsewhere, the purpose of this is, then, to place all emphasis on professional service and to minimize or eliminate all profit on necessary materials. It would seem that these represent minimum objectives

for which we must strive in order to avoid the stigmatization arising from the suspicion that glasses ever are prescribed because of the monetary advantage accruing to the refractionist. That this is a widely prevalent and deep-rooted suspicion, all of us are poignantly aware. The possibility of this suspicion must be removed at all costs, and we can see no certain method of accomplishing this except in the manner suggested.

Again, it must be emphasized that it is not being suggested that the optometrist reduce his income. To illustrate this point let us assume that one has been getting $25.00 as a total charge, classifying this as $5.00 for professional service and $20.00 for glasses. This could be altered to a *minimum* fee of $15 for refraction and a uniform $10.00 for complete glasses, regardless of foci or type of lenses or mounting used. This total is still $25.00, but $15.00 is for professional service. Should lenticular lenses or very expensive bifocals or trifocals be indicated, the professional fee would be increased correspondingly, *in proportion to the additional professional responsibility*—not in proportion to the price of costlier materials. We must stress, however, that it is a useless evasion to merely tell the patient that the whole charge is for professional service and that it includes the cost of the glasses, for sooner or later the patient will want an extra pair of glasses, or has to replace a broken lens; he can easily add and substract round numbers, from and to, $25.00 and arrive at *your* valuation of your services; he will assuredly not value the latter any higher than you do.

Perhaps it would be wise at this point to indicate a second possible pitfall for those whose thinking is inadequately geared to the concept of professional service. It is this: you cannot get a proper fee for a five or ten minute examination. When the majority of optometrists change to a fee system rather than a price-for-glasses system, it will make things exceedingly difficult for the commercialist with his low (or absent) fee which will be thrown in its true light as just compensation for poor service.

It is, however, evident that a complete case-analysis is worth an adequate fee and seldom, indeed, will a patient object to paying for services rendered.

Certainly no system of ethics will succeed that ignores the material facts of life. It becomes necessary then, to consider other of the practical aspects of this suggested system. Consider for example the optometrist who charges $10.00 for glasses regardless of foci or frame material.

This sum may be divided into $6.00 for the lenses ($3.00 each) and $4.00 for the frame. It is estimated that this represents the average

cost year in and year out, for materials. But, suppose that this patient needs a replacement of frame or a lens; he still pays the same price for the cost of the material, but since there is additional technical service involved in fitting, mounting, verifying and adjusting this new material, a corresponding service fee is and must be added. Note that this fee is part of the professional fee at the time of the refraction. The reason for these extended references to the minutiae of practice of a single practitioner are to indicate the possibility and practicality of charging for service rather than material. When it is added, however, it must be again revealed to the patient.

Certain advantages derive from this method of stressing professional fees and minimizing material charges that are immediately noticeable. Most of us have had a patient who felt obliged to use his old frame for new lenses, often ill-advisedly because of excessive wear. When the material-charge difference is slight, most persons will consider getting a new frame instead of using the old one, and the small town optometrist, at least, is thus spared the trouble of mounting or inserting the lenses when they are delivered from the laboratory, or the patient is spared the inconvenience of being without a correction for several days while new lenses are being fabricated. In the course of time considerable annoyance and inconvenience are avoided in this manner and, in general, patients are better fitted when new materials are used throughout. Again, since there is little net-cost differential between the finest materials and the cut-price items, the patient can be given the best in every case.

In conclusion, it is suggested that (1) the professional fee should constitute the bulk of the charge to a patient needing glasses, (2) that this fee should not be nominal, (3) that material charges should approximate the net laboratory costs when dealing with new refractions and, (4) that repairs and replacements of material should be itemized as (a) laboratory cost plus and (b) a service fee, again not nominal. It is contended that these objectives are desirable and necessary for the professional advancement of the optometrist and are not only possible but practicable. It is further suggested that the professional dignity of the optometrist is considerably enhanced when it is apparent that no mercenary motive can possibly have any influence on his professional judgment in the prescribing of glasses.

508 FRONT STREET
BEAUFORT, NORTH CAROLINA.

A PLEA FOR A PROGRAM OF PREPAID HEALTH CARE*

Ernest A. Hutchinson†
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Los Angeles, California

FOREWORD

Some time ago, the Editor of the *American Journal of Optometry and Archives of American Academy of Optometry* extended to the writer an invitation to express his views on health insurance. The invitation was not accepted in the hope that our Journal could steer clear of the more mundane aspects of our profession and confine itself to technical and scientific matters. That indicated no reluctance on our part to enter the lists and challenge the ideas expressed by the Editor and the action taken by the Executive Council of the Academy at Winston-Salem, North Carolina, opposing compulsory health insurance. Eventually we relented, since quite evidently the Editor and his advisors do not share our views either as to the legitimate field of the Journal or on the subject under discussion. This is a free country, and it is their responsibility to decide such matters. More power to them! On this issue we are their Majesties "Loyal Opposition."

The following article represents the personal views of the writer and does not commit the institution with which he is connected to the ideas expressed.

In the March [1949] issue of the Journal in which appears Koch's editorial "An Alternative to Compulsory Health Care" are these statements in a book review of "Education for What Is Real": "Fear seems to be the outstanding characteristic of our age and is responsible for most of our problems." and, "Cooperation, rather than a basic habit of suspicion, is needed to solve our social, educational, and political problems."

Fear based upon self interest is the outstanding characteristic of the flood of propaganda let loose on an unsuspecting public and upon a large, skeptical but highly intelligent minority—by the beneficiaries of the existing system or lack of system. Fear led the proprietors of private schools to oppose the establishment of a public school system. Has anyone the temerity to suggest that we abandon our system of universal free education and go back to the old method of "free enterprise" in education?

In these days it is axiomatic that schools shall not be operated for profit.

If we wished to push our thesis to its logical conclusion we might suggest that health care operated for profit is a ghoulish business. However, that is getting into the area of ethics which is not the issue now before the nation. The issue simply stated is "*millions of people in*

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*these United States are denied adequate health care,** and that *no system short of compulsory insurance* has been or *can be devised to meet the need.*"

The *New York Times* of April 3 [1949] quotes the American Academy of Pediatrics to the effect that there are not enough qualified doctors to give adequate medical care to our thirty-six million children, especially those resident in rural areas. A like condition prevails in all aspects of medical care.

If we were to concede, which we do not, that the very rich and abjectly poor are amply provided for under the existing system, that still leaves many millions of low and moderate income persons and their dependents totally unable to meet the costs of adequate health care.

Now if the Editor of the *American Journal of Optometry and Archives of American Academy of Optometry* or anyone else will furnish proof that the present method of financing health care is functioning, or can function to secure to every person in the commonwealth adequate provision for all health needs, if he or they can produce evidence that the people now are receiving such care and that proper care does not impose an insupportable burden of debt—if he or they can refute the results of careful scientific surveys conducted by such authorities as Dr. Paul A. Dodd, economist at the University of California (Los Angeles) and Dr. E. A. Penrose, associate professor of economics at the University of California (Berkeley), then there is no need for a change. But quite evidently change is in the air.

The Gallup Poll, unabashed by its election fiasco, has turned to public health plans, and if its figures have validity, 80 per cent of the people were listed as favoring some plan, divided 33 per cent for the Truman (?) plan and 47 per cent for the A. M. A. plan. We will leave it to our readers to judge as to which would be more favorable to optometry.

As to the above figures—we doubt whether a Gallup Poll is properly representative of the people who stand most in need of a prepayment plan of health care. If it were and those in need did not realize their need and the possibilities of meeting it, yet the professions are in duty bound to sense the situation and make provisions for it—thinking first of the needy and secondly of their own professional interests.

Be assured that there is a deep seated dissatisfaction with the present set-up and an insistent demand for a better system. We are tempted to remark that it pays to advertise. It would seem that money talks. But adversity talks louder and the demand for a prepayment method

*See page 215.

of providing for health care will increase, building up such pressure as will carry all before it.

A workable prepayment plan is the surest bulwark against socialization. Too many writers do not realize the difference. Under prepayment the doctor-patient relationship is not disturbed. Under socialization those engaged in health professions become the paid servants of the community.

Another phase of this subject is the matter of incentive. We are told that any modification of the existing system would abolish incentives to superior work and stymie medical education.

Refutation of this contention is transparently clear.

To whom did the government turn for every kind of scientific knowledge in the war emergency? Obviously to the universities.

Just what sort of incentives in the way of fancy fees or large salaries does the average college man receive? How do college incomes compare with those of professional men in health services? Do they hold out on society for lack of incentive? This would be a sorry country if they did. Almost all the amenities of our modern civilization stem from patient, plodding investigation by devoted men in physics, chemistry, biology and other laboratories. A modest livelihood and the knowledge that they are contributing to human welfare is their satisfactory reward. Unless the healing arts secure for themselves some share in this spirit, then Ichabod must be written over them, for indeed "Their glory has departed."

Finally something needs to be said regarding the men who launch such projects in our legislative halls.

It is a total mistake to make Oscar Ewing or any other politician the scapegoat in this matter. No time serving politician on his own volition would challenge such a powerful organization as medicine with all its allies. The medical lobby is one of the most expensive in Washington. Rest assured that those who favor this movement in Congress are responding to a popular demand.

In this case the affirmative side of the issue represents the common people, the wage earners and those enlightened people who are willing to risk unpopularity to advocate what they feel to be a humanitarian measure.

The movement may not have access to sources of public information. They cannot command "millions of dollars" like the medical profession but they do have votes—and they are learning how to

use them to get what they want. They may be delayed. They will not be thwarted.

Vox Populi, Vox Dei. Perhaps the profession had better listen.

950 WEST JEFFERSON BOULEVARD
LOS ANGELES, CALIFORNIA

BOOK NOTICE

FUNDAMENTALS OF PRACTICAL OPTOMETRY. Harold R. Barnes (Columbia University), Sargent Book Co., 343 Burncoat St., Worcester, Mass., 5th edition, 1948, 211 pp., $6.50.

The flair for adjectives, obscurely technical terms (often misused), the theoretical take-offs and sensational ridicule that is found in much of the writing on refraction and allied subjects in recent years is refreshingly absent in Barnes' book on the *Fundamentals of Practical Optometry.*

As stated in the preface, this book was written for students; nevertheless, it should serve also as an excellent review and source of information for the practicing optometrist. It is a practical book describing in non-academic, conversational-style language the various techniques used in refraction. It purposely avoids the theoretical aspects of retinoscopy, ophthalmoscopy, ophthalmometry, and subjective testing, but it succeeds in describing clearly the step-by-step procedure of making these essential tests.

Considerable space is well given to the methods of ophthalmoscopy and retinoscopy on that willing subject, the schematic eye. Repeated practice is urged for the attainment of proficiency in retinoscopy and ophthalmoscopy. The author describes a schematic eye kit which he devised and which includes lenses and plates simulating the elementary features of special conditions such as conical cornea, lenticular and fundus changes. It is pointed out that the optometrist "unable to employ intelligently a retinoscope is relatively as incompetent as a physician ignorant of the use of the stethoscope."

Chapter I covers an introduction to and the definitions of the fundamental terms associated with refraction by retinoscopy.

Chapters II and III are concerned with experiments on the apparent motion of fundus reflexes and the elementary instructions of how to hold and rotate the retinoscope. The determination of spherical ametropia by retinoscopy is elucidated clearly and completely.

The determination of the amount and axis of astigmatism by

means of retinoscopy and the schematic eye is covered in Chapter IV.

The technique of static retinoscopy on the human eye is described in Chapter V. Special consideration is given to the control of accommodation, and also, to unusual conditions such as irregular astigmatism, scissor movement, conical cornea, keratoconus, etc.

Chapters VI, VII, VIII, and IX are devoted to dynamic retinoscopy, including the modified Cross method, Sheard's method and Tait's method. The significance of high and/or low adds to reversal, lag of accommodation, dynamic aberration, etc., are discussed intelligently.

Chapters X, XI and XII describe techniques of refraction by subjective methods. The proper fog for controlling the accommodation is stressed and detailed instructions are given in the use of astigmatic charts, and cross cylinder tests; the determination of phorias by means of the Maddox Rod and dissociating prisms; the measurement of the amplitude of accommodation and the recording of the visual acuity for distance and near fixations, monocularly and binocularly.

Ophthalmometry is the subject matter contained in Chapter XIII and various models (Genothalmic, Keratometer, Micromatic) are described. The technique of determining the corneal curvatures, the recording of the data, and the various rules of allowances are presented clearly and succinctly.

The inclusion of Chapter XIV on case history and symptomatology implies that the most accurate determination of a patient's ametropia and heterophoria is not adequate information for purposes of treatment. Careful consideration of the chief complaint and general symptoms, past and present, are essential in the final disposition of every case. Several suggestions are given as an aid in history taking and pertinent details suggesting pathological conditions are described.

Ophthalmoscopy is given ample attention in Chapters XV, XVI, and XVII. Instructions as to the positions of the examiner and the patient for the exploration of the fundus by means of direct and indirect ophthalmoscopy are given in detail. Of special importance are the comprehensive descriptions of 24 fundus plates that may be used in a schematic eye for ophthalmoscopy practice. These plates simulate the fundus appearance in the most common forms of ocular pathology and enable the student by repeated practice and observation to become competent in the detection of internal ocular anomalies.

The lack of bibliography is to be regretted but may be condoned by the fact that the material presented is unequivocal and represents the experience of the author and his associates in more than twenty years of teaching and clinical practice. The value of the step-by-step proce-

dures presented in this book is attested by the numerous students and practitioners who have urged the author to compile the four previously mimeographed editions into book form.

ROBERT E. BANNON.

CURRENT COMMENTS

Virginia Huck
Editorial Assistant

Optometrists will confer a favor by sending news items of general interest for this department: such as relate to new instruments, clinical techniques, education, visual health and optometric legislation and organization.

GOVERNMENT HEALTH INSURANCE NO BONANZA

Visions of huge profits apparently have convinced some of our correspondents that the administration-backed Ewing plan for compulsory health insurance should be adopted. One practitioner envisions himself making 4,000 refractions each year, with no dispensing, and has it nicely figured out that at a $5.00 federal refraction fee, he would gross approximately $1,650.00 a month.

Careful reasoning shows that about the only correct deduction this practitioner made is that he would not be permitted to dispense.

In order to perform 4,000 refractions in a 12-month period an optometrist would have to work 300 days a year, and do 13⅓ refractions in each of these working days. Any practitioner knows that refractions cannot be done properly at that speed. (In this connection it is interesting to note that the British government is proposing a limit of 25 refractions with dispensing for each optometrist a week under the present British scheme.)

As for the refraction fee, we again point out that the administration's plan for compulsory health insurance proposed by Ewing provides that professional fees shall be set by the government. While it is probable that optometric organizations will be called in to negotiate with government officials, should this plan go into effect, it is not likely that the government will—nor can it be expected—to compensate optometrists in amounts materially greater than their average current annual earnings. From this, we can conclude that while the government would expect the best possible refractive service, it probably would also expect this at fees which would not net the individual practitioner more than $5,000 or $6,000 a year.

Many, though not all, British optometrists found themselves exceedingly busy right after the program started in July, 1948, and for

a time, it looked as though their health scheme was a bonanza. However, the government is now setting the stage to materially reduce the refraction fee to bring current incomes in line with the historical past. According to Editor Giles of the *Dioptric News*, British optometrists are not getting rich from the national health service program. He points out that "it is certain that many are worse off today than they were in the year preceding the scheme."

WILINSKY AND CARMICHAEL A. O. A. SPEAKERS

Leaders in the field of public health and education will speak at the 52nd Annual Congress of the American Optometric Association, according to the program committee. Dr. Charles Wilinsky, president of the American Public Health association, and Dr. Leonard Carmichael, president of Tufts College, Boston, will speak to delegates when they meet in Boston, June 26-29.

To help insure the success of this year's A. O. A. congress, the New England Council of Optometrists voted to postpone its 28th annual convention and lend a hand to the A. O. A.

D. S. F. OBSERVES 23RD ANNIVERSARY

Observing its 23rd anniversary this year is the Distinguished Service Foundation of Optometry. Created in 1927 by Dr. George Stevens Houghton to recognize and further research in optometry, the Foundation has since awarded medals for scientific achievements to 24 persons, as well as to the Department of Research in Physiologic Optics of the Dartmouth Medical School. A list of the medalists is included in the Foundation roster recently off the press, as are the names of those given Fellowships. Fellowships have been granted to nearly 150 men and women engaged in work in the visual field.

TEMPLE READING CLINIC DATES

Temple University's summer reading clinic will begin June 27, Director Emmett A. Betts announced in a recent bulletin. A second summer session will begin August 8. Each session will run five weeks. Dr. Betts also announced the date of the 1950 winter reading clinic: January 30 to February 3, 1950. Further information is available from Dr. Betts, care of the Reading Clinic, Department of Psychology, Temple University, Philadelphia 22, Pennsylvania.

MISSOURI VALLEY OPTOMETRISTS ORGANIZE

Missouri Valley optometrists officially organized the Missouri Valley Optometric society recently at a meeting in Sioux Falls, South

Dakota. The group was organized to discuss educational advancements in optometry. Officers elected for 1949 are: Dr. M. W. Getman, Sioux City, Iowa, president; Dr. J. H. Bechtold, Sioux Falls, South Dakota, president elect; Dr. G. N. Getman, Luverne, Minnesota, secretary-treasurer. In addition, vice president for each state in the organization were elected as follows: For South Dakota, Dr. Tom Nooney, Sioux Falls; Iowa, Dr. A. L. Klein of Spirit Lake; Minnesota, Dr. Jenny Olander, Pipestone, and for Nebraska, Dr. R. R. Dietz of Hartington. Plans for regular workshops were made at the meeting.

FIRST CONTACT LENS CLINIC FOR INDIGENT OPENED

America's first free contact lens clinic opened at the Pennsylvania State College of Optometry March 25, with television recording the event. Philadelphia's Mayor Samuel cut the ribbon which officially marked the opening of the clinic. Present at the ceremony were Dr. Albert Fitch, president of P. S. C. O., Dr. Lawrence Fitch, Dr. William Feinbloom, Dr. John C. Neill, as well as other faculty members and clinicians. The television pictures were shown on Station WFIL-TV twice on the opening day.

In his dedication speech, Dr. Albert Fitch explained that the contact lens clinic will be used for graduate and undergraduate instruction as well as for serving the public. Patients needing the services of the contact lens clinic will be referred only after an examination at the P. S. C. O. eye clinic, Dr. Fitch said. The clinic will accommodate six patients at a time.

CONTACT LENS SPECIALIST MOVES TO TEL AVIV

Mr. Jack Raphael has resigned the editorship of *The South African Optometrist*, and given up his practice in Johannesburg, in order to devote his time to building up the new Jewish state of Israel. His address in Israel is Box 1095, Tel Aviv.

Mr. Raphael started practicing in Johannesburg in 1921, after receiving his education in England. He is known to American optometrists not only for his work on the *South African Optometrist*, but also his work in the contact lens and artificial eye fields.

The editorship of *The South African Optometrist* will be carried on by Mr. W. R. Coates, who has been co-editor with Mr. Raphael.

GRAHAM RECEIVES FACULTY APPOINTMENT

Contact lens specialist Dr. Robert Graham has been appointed to the faculty of the College of Medical Evangelists in Los Angeles. Dr. Graham will be special lecturer on optics and lenses. He was also recently

appointed associate professor in charge of contact lens courses at the Los Angeles College of Optometry.

BULL'S-EYE BY WICK

Author-optometrist Ralph Wick of Rapid City, South Dakota, gives some tips to hunters on the care of their eyes in *Sports Afield's* May issue. His article, "That Shootin' Eye," handles expertly the always difficult problem of explaining visual problems to the lay person.

NEWS BRIEFS

A one-day institute on school children's vision was sponsored in April by the New Jersey Optometric Association. School teachers, nurses, optometrists, architects and parents attended the conference held in Asbury Park. . . . The Hofstetter record cards have been placed on the market by the Benson Optical Company of Minneapolis. This card was described in detail in this department last January. Benson's have made up the card in two forms—single and double. . . . Dr. Robert Graham, research director of the Armorlite Lens Company, recently announced a new feather-weight plastic safety lens which is wipe-proof. . . . Per patient eye care in Great Britain is 60 per cent higher than in the United States, Walter A. Stewart, American Optical Company president, pointed out at the 1949 shareholders meeting. . . . The board of directors of the California Optometric association has gone on record favoring the principal of prepaid health care "provided all professions concerned with health care are allowed to participate on equal status." . . . Optometry's oldest legislative act was overhauled at the 1949 session of the Minnesota State legislature. Minnesota's 48-year-old law was brought in line with progressive measures already in effect in other states. . . . The New Jersey optometric act has been upheld by the Superior Court of New Jersey. The law was attacked by commercial optical interests in that state. New Jersey's optometry act is considered one of the model optometry laws of the country, and this recent court victory has met with widespread approval.

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